

IN THE CLAIMS:

- 1 1. (Original) An intermediate network device for use in a computer network having a
- 2 plurality of entities configured to issue requests to reserve network resources for use by
- 3 traffic flows, the reservation requests specifying one or more flow parameters, the inter-
- 4 mediate network device comprising:
 - 5 a traffic scheduler having one or more network resources for use in forwarding
 - 6 network traffic received at the device at different rates;
 - 7 a classification engine configured to identify network messages belonging to re-
 - 8 spective traffic flows based upon predefined criteria;
 - 9 a resource reservation engine in communicating relationship with the traffic
 - 10 scheduler and the classification engine, the resource reservation engine including a flow
 - 11 analyzer; and
 - 12 one or more sets of predefined heuristics that are accessible by the flow analyzer,
 - 13 wherein
 - 14 the flow analyzer applies the one or more sets of predefined heuristics to the one
 - 15 or more flow parameters specified in the reservation requests, and
 - 16 in response to the application of the one or more sets of predefined heuristics, the
 - 17 flow analyzer selects a queue and/or a queue servicing algorithm for assignment to the
 - 18 traffic flow corresponding to the reservation request.

- 1 2. (Original) The intermediate network device of claim 1 wherein
- 2 the classification engine is directed to identify network messages belonging to the
- 3 traffic flow, and
- 4 the traffic scheduler is directed to place network messages identified as belonging
- 5 to the traffic flow in the selected queue.

- 1 3. (Original) The intermediate network device of claim 1 wherein
- 2 the selected queue is one of a priority queue (PQ) and a reserved queue, and
- 3 the PQ is drained before any other queues.

- 1 4. (Original) The intermediate network device of claim 3 wherein
- 2 a first set of heuristics is provided for determining whether the respective traffic
- 3 flows carry real-time voice information, and
- 4 traffic flows that are determined to carry real-time voice information are assigned
- 5 to the PQ.

- 1 5. (Original) The intermediate network device of claim 4 wherein the flow parameters
- 2 include one or more of an average data rate, a peak data rate and a token bucket rate.

- 1 6. (Original) The intermediate network device of claim 4 wherein
- 2 the resource reservation engine utilizes the Resource reSerVation Protocol
- 3 (RSVP) specification standard, and

4 the flow parameters are located in a RSVP Reservation (Resv) message received
5 by the device.

1 7. (Original) The intermediate network device of claim 6 wherein the flow parameters
2 include one or more of a token bucket rate (r) value, a token bucket size (b) value and a
3 peak data rate (p) value.

1 8. (Original) The intermediate network device of claim 7 wherein a first set of predefined
2 heuristics is given by the following equation:

3
$$(r \leq r') \text{ AND } (b \leq b') \text{ AND } \frac{p}{r} \leq p_to_r'$$

4 where,

5 r' is a programmable token bucket rate constant, b' is a programmable token
6 bucket size constant, and p_to_r' is a ratio of peak data rate to token bucket rate con-
7 stant.

1 9. (Original) The intermediate network device of claim 8 wherein r' is approximately
2 12288 bytes/second, b' is approximately 592 bytes/second and p_to_r' is approxi-
3 mately 110 percent.

1 10. (Original) The intermediate network device of claim 4 wherein

2 a reserved queue is selected for each traffic flow that does not satisfy the first set
3 of heuristics, and
4 a Weight Fair Queueing (WFQ) queue servicing algorithm is applied to the re-
5 served queues.

1 11. (Original) The intermediate network device of claim 2 wherein the flow analyzer, in
2 response to the application of the one or more sets of heuristics, associates a selected Per-
3 Hop Behavior (PHB) with the traffic flow corresponding to the reservation request.

1 12. (Original) The intermediate network device of claim 1 wherein
2 the resource reservation engine utilizes the Resource reSerVation Protocol
3 (RSVP) specification standard, and
4 the flow parameters are located in a RSVP Reservation (Resv) message received
5 by the device.

1 13. (Original) In a computer network having a plurality of entities interconnected by a
2 plurality of intermediate network devices having one or more resources for use in for-
3 warding network traffic flows, a method for assigning queues and/or queue servicing al-
4 gorithms to the traffic flows, the method comprising the steps of:
5 receiving a reservation request message specifying one or more flow parameters
6 and a given traffic flow;

7 applying one or more sets of heuristics to the flow parameters of the received res-
8 ervation request message; and
9 selecting a queue and/or a queue servicing algorithm for use with the given traffic
10 flow based on the application of the one or more sets of heuristics.

1 14. (Original) The method of claim 13 wherein a first set of heuristics is given by the
2 following equation:

3
$$(r \leq r') \text{ AND } (b \leq b') \text{ AND } \frac{p}{r} \leq p_to_r'$$

4 where,

5 r is a token bucket rate value,

6 r' is a programmable token bucket rate constant,

7 b is a token bucket size value,

8 b' is a programmable token bucket size constant, and

9 p_to_r' is a ratio of peak data rate to token bucket rate constant.

1 15. (Original) The method of claim 14 wherein r' is approximately 12288 bytes/second,
2 b' is approximately 592 bytes/second and p_to_r' is approximately 110 percent.

1 16. (Original) The method of claim 13 wherein
2 a first set of heuristics is provided for determining whether the respective traffic
3 flows carry real-time voice information, and

4 a given traffic flow that is determined to carry real-time voice information, based
5 on the first set of heuristics, is assigned to a priority queue (PQ) that is drained before all
6 other queues.

1 17. (Original) The method of claim 14 wherein each traffic flow that is determined to
2 carry other than real-time voice information is assigned to a selected reserved queue.

1 18. (Original) The method of claim 17 further comprising the step of applying a Weight
2 Fair Queuing (WFQ) queue servicing algorithm to the reserved queues.

1 19. (Original) The method of claim 13 wherein the flow parameters include one or more
2 of an average data rate, a peak data rate and a token bucket rate.

1 20. (Original) The method of claim 13 wherein the reservation request message corre-
2 sponds to a Reservation (Resv) message as provided in the Resource reSerVation Proto-
3 col (RSVP) specification standard.

1 21. (Original) The method of claim 20 wherein the flow parameters include one or more
2 of a token bucket rate (r) value, a token bucket size (b) value and a peak data rate (p)
3 value.

1 22. (Previously Presented) An intermediate network device for use in a computer net-
2 work having a plurality of entities configured to issue requests to reserve network re-
3 sources for use by traffic flows, the reservation requests specifying one or more flow pa-
4 rameters, the intermediate network device comprising:

5 means for receiving a reservation request message specifying one or more flow
6 parameters and a given traffic flow;

7 means for applying one or more sets of heuristics to the flow parameters of the
8 received reservation request message; and

9 means for selecting a queue and/or a queue servicing algorithm for use with the
10 given traffic flow based on the application of the one or more sets of heuristics.

1 23. (Previously Presented) The intermediate network device of claim 22, further com-
2 prising:

3 means for providing a set of heuristics to determine whether the respective traffic
4 flows carry real-time voice information, and

5 means for assigning a traffic flow that is determined to carry real-time voice in-
6 formation, based on the set of heuristics, to a priority queue (PQ) that is drained before all
7 other queues.

Please add new claims 24 *et al.*

- 1 24. (New) A method for operating a router, comprising:
 - 2 receiving a reservation request message specifying one or more flow parameters
 - 3 and a given traffic flow;
 - 4 applying one or more sets of heuristics to the flow parameters of the reserved res-
 - 5 ervation request message; and
 - 6 selecting a queue based on the reservation request, the flow parameters, and the
 - 7 one or more sets of heuristics.

- 1 25. (New) The method of claim 24, further comprising:
 - 2 determining, by the one or more sets of heuristics, whether the given traffic flow
 - 3 carries real-time voice information.

- 1 26. (New) The method of claim 24, further comprising:
 - 2 specifying, by the flow parameters, the given traffic flow carries real-time voice
 - 3 information.

- 1 27. (New) The method of claim 24, further comprising:

2 selecting a priority queue for the given traffic flow when the one or more sets of
3 heuristics determines the flow parameters indicate the given traffic flow is carrying real-
4 time voice information.

1 28. (New) A router, comprising:

2 means for receiving a reservation request message specifying one or more flow
3 parameters and a given traffic flow;
4 means for applying one or more sets of heuristics to the flow parameters of the
5 reserved reservation request message; and
6 means for selecting a queue based on the reservation request, the flow parameters,
7 and the one or more sets of heuristics.

1 29. (New) The router of claim 28, further comprising;

2 means for determining, by the one or more sets of heuristics, whether the given
3 traffic flow carries real-time voice information.

1 30. (New) The router of claim 28, further comprising:

2 means for specifying, by the flow parameters, the given traffic flow carries real-
3 time voice information.

- 1 31. (New) The router of claim 28, further comprising:
 - 2 means for selecting a priority queue for the given traffic flow when the one or
 - 3 more sets of heuristics determines the flow parameters indicate the given traffic flow is
 - 4 carrying real-time voice information.